Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	)	**GN Docket No. 09-47**
	)	
A National Broadband Plan for Our Future	)	**GN Docket No. 09-51**
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act.	)	**GN Docket No. 09-137**

COMMENTS OF THE EDISON ELECTRIC INSTITUTE

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October 2, 2009

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EXECUTIVE SUMMARY

- The electric industry supports the FCC's efforts to develop a national broadband plan that promotes the deployment and availability of broadband infrastructure and addresses the public policy goals established by the President and Congress, and urges the Commission to give great weight to the needs of entities that use communications services and systems such as the electric power and other critical infrastructure industries.

- Energy independence and efficiency is a national priority which requires the availability of robust communications systems to support existing and future utility operations.

- Electric utilities already rely on wireless communications. For example, electric utilities have extensive wireless communications needs, such as to support maintenance, remote control and monitoring, field crews throughout service territories, and communication between individual customer meters and the utility.

- For many electric customers, the path to higher efficiency and energy independence involves utilities deploying Smart Grid applications that will require new or upgrading existing communications infrastructure.

- As part of their deployment strategies, utilities must have the flexibility to determine how to meet their communications requirements. There is no one-size-fits-all Smart Grid communications solution to the question of suitability of technology.

- Electric utilities are deploying and will deploy a variety of Smart Grid applications using a variety of public and private communications networks, and using licensed and unlicensed spectrum, as appropriate to meet their communications requirements.

- Electric utilities face existing spectrum constraints for the use of private wireless networks, and find that commercial systems generally are not able to provide for all utility communications requirements, which will increase with the deployment of Smart Grid technology. Therefore, EEI supports the FCC making licensed spectrum available to utilities and critical infrastructure industries below 2 GHz and should consider allocating the 1800-1830 MHz band for this use.

- EEI emphasizes that there should not be mandates for the use of licensed or unlicensed spectrum, or the use of particular meters or specific wireless technologies. All current systems that fully comply with FCC requirements should be allowed.

- EEI describes the current state of access to customer data (consumption and pricing), advanced meter infrastructure deployment, and the expectation that a multitude of devices will be connected to such meters and the internet, which will raise issues of cost, security and privacy. In sum, the potential for growth of these systems will contribute to the use of real-time data and communication system requirements.

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COMMENTS OF THE EDISON ELECTRIC INSTITUTE

The Edison Electric Institute ("EEI"), on behalf of its member companies, hereby respectfully submits the following comments in response to the request by the Federal Communications Commission's ("FCC" or "Commission") for comments on the implementation of Smart Grid technology in the above captioned proceeding.[1] EEI fully supports the comments of the Utilities Telecom Council ("UTC"), including an allocation of the 1800-1830 MHz band to be shared between utilities and Federal government users in support of Smart Grid.

EEI is the association of the United States investor-owned electric utilities and industry associates worldwide. Its U.S. members serve almost 95 percent of all customers served by the

[1] See NBP Public Notice #2, In the Matter of A National Broadband Plan for Our Future, GN Docket Nos. 09-47, 09-51, 09-137 (September 4, 2009)("Notice").

shareholder-owned segment of the U.S. industry, about 70 percent of all electricity customers, and generate about 70 percent of the electricity delivered in the U.S. EEI frequently represents its U.S. members before Federal agencies, courts, and Congress in matters of common concern, and has filed comments before the Commission in various proceedings affecting interests of its members.

EEI's members may be directly and indirectly affected by the instant proceeding, as both users and providers of broadband networks and services. The primary interest of EEI's members in this proceeding is in the advancement of policies that promote the availability of broadband networks and services for private internal communications to support the safe, reliable and efficient delivery of essential services to the public at large. EEI members are primarily focused on their core service as electric utilities and they are not competitors in the broadband market – they are end users.

INTRODUCTION

EEI supports the Commission's efforts to develop a National Broadband Plan that addresses the use of broadband infrastructure and services in advancing the public policy goals that Congress set forth in the American Recovery and Reinvestment Act of 2009, which includes advancing consumer welfare, community development, public safety and homeland security, and energy independence and efficiency.[2] Furthermore, the Recovery Act clearly indicates that Congress intended for the National Broadband Plan to be viewed and developed as one of many interrelated components of a broader national policy effort that encompasses a wider array of

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[2] See American Recovery and Reinvestment Act of 2009, Pub. L. No 111.5, § 6001(k)(2)(D), 123 Stat. 115 (2009)(the "Recovery Act") (specifically directing the Commission to include "a plan for the use of broadband infrastructure and services in advancing . . . energy independence and efficiency").

interests and issues that include energy independence and efficiency. Therefore, as the Commission develops its National Broadband Plan, the Commission should not only consider the needs of broadband providers, but also give great weight to the needs of those entities that use telecommunications services in providing the services and inputs that are necessary for broadband service to exist, such as electric power and other critical infrastructure industries ("CII").[3]

In this regard, in order to provide safe, reliable electric service, utilities must have communications systems that are robust and reliable. The Commission should recognize that reliable wireless communications are already essential to utility operations. The demands on these communications systems will be even greater with the deployment of Smart Grid technologies and other broadband applications along with the implementation of reliability, cyber security, and other critical infrastructure protection standards to safeguard those technologies. For many electric customers, the path to higher efficiency and energy independence involves utilities deploying Smart Grid applications that will require new or upgrading existing communication infrastructure. Given that utilities vary greatly in structure, geography, population/demographics, state/local regulations, and economics, utilities must have flexibility to plan on how to meet their communications system requirements considering a broad array of variables such as functional and performance requirements, network ownership and technology options, and network management approaches. As part of their deployment strategies, utilities must decide on issues such as building, sharing or leasing a network from a telecommunications provider. Electric utilities must also have the flexibility to decide how to manage a network and how to comply with applicable standards.

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[3] See 47 C.F.R. § 90.7 (definition of "critical infrastructure industry").

EEI does not believe there is a one-size-fits-all Smart Grid communication solution to the question of suitability of technology. EEI believes that Smart Grid applications will continue to be deployed by utilities using a variety of public and private communications networks, as well as using both licensed and unlicensed spectrum. Hence, the Commission is correct to seek to understand how network requirements vary by potential Smart Grid applications and the array of technologies and networks that can meet these requirements and to examine the availability of communications networks and the fact that there are no existing communications networks in many areas where electric utilities must operate.

Electric utilities already face significant spectrum constraints even as their need for spectrum is increasing. Electric utilities and CII need private internal systems to support their critical infrastructure systems; commercial systems are not well suited to utility needs for various reasons. One example is that the public telephone networks become overloaded and can be unavailable during and in the aftermath of emergencies and natural disasters. Utilities and CII need to have a communications system they can count on, and most commercial systems are not designed to withstand hurricanes and do not have the battery back-up CII need to communicate in areas where power has been knocked out. While utilities and CII do make some use of commercial systems, these are usually for secondary communications. An efficient grid requires utilities to have private communication systems and spectrum capacity to support broadband communications infrastructure necessary for safe and reliable operations. If suitable networks and spectrum is not available for utility Smart Grid wireless connections, then the goals for Smart Grid may fall short.

In order to help ensure that utility communications systems are capable of covering the entire grid regardless of terrain or population in a reliable manner the Commission should make licensed spectrum available to utilities and CII below 2 GHz. However, the Commission should specifically consider allocating the 1800-1830 MHz band for this use since this band is currently allocated for federal government use and could be made available for utility and CII operations. Furthermore, this band has been allocated in Canada to support the operations, maintenance and management of the electric supply; and EEI has supported harmonizing the use of this band with Canada, which shares an electric grid with the United States. EEI emphasizes that there should be no intention to mandate a particular Smart Grid application's use of specific spectrum whether licensed or unlicensed, or the use of specific wireless technologies. Unlicensed spectrum systems may be used in a robust, reliable and secure manner. Thus all current systems, as well as systems under development, that fully comply with FCC requirements must be allowed.[4] Given utilities' reliability needs and the cost constraints of rate-regulated utilities, EEI does not believe that either unlicensed operations, or commercial spectrum auctions, or leases are capable of solely fulfilling the needs of the electric industry.

Finally, EEI responds to the Commission's request for information on real-time data, Smart meters, and Home Area Networks ("HANs") by describing below the state of customer access to real-time data, deployment of advanced metering infrastructure ("AMI") and access customer data. In this regard, EEI points out the significance of utilities having the underlying communications infrastructure in order support dynamic pricing, which includes real-time pricing. However, EEI wishes to underscore that there should be no mandate for utilities to use AMI because this decision must be made with respect to utilities' goals and in concert with

[4] See Testimony of George W. Arnold, National Coordinator for Smart Grid Interoperability, National Institute of Standards and Technology, U.S. Department of Commerce, before the House Science and Technology Subcommittee on Energy and Environment, U.S. House of Representatives (July 23, 2009)(stating "there is no intention to mandate for smart meter systems the use of specific spectrum ("licensed or unlicensed) or the use of specific wireless technologies. Thus, all current systems, as well as all systems under development, which fully comply with FCC requirements, will be allowed.").

applicable regulators since these expenditures must pass a benefit-cost test and be approved. In addition, EEI explains how customer access to data is generally provided as well as the current state of third-party access to data.

BACKGROUND

Today, electric utilities rely on communications systems for their core mission: safe and reliable delivery of power to consumers at reasonable costs. Electric utilities have extensive wireless communications needs, such as to support maintenance, remote control and monitoring, routine and emergency dispatch of field crews throughout service territories, and communication between individual customer meters and the utility. Utilities rely on a number of different wireless applications and services to support their critical operational needs. For example, utilities rely on private land mobile radio systems for crew communications, supervisory control and data acquisition ("SCADA") systems, and other applications necessary to ensure the safe, reliable, and efficient delivery of electric power.

Moreover, it is significant that pursuant to the Energy Policy Act of 2005 ("EPAct 2005"),[5] the Federal Energy Regulatory Commission ("FERC") and the North American Electric Reliability Council ("NERC") have adopted mandatory and enforceable Reliability Standards for electric utilities, including cyber security standards. Compliance with these standards requires utilities to have reliable, secure communications systems capable of handling large amounts of data and traffic with an extremely low level of latency that only broadband can provide. Other broadband applications that utilities need for their own internal uses include, but are not limited to, mapping for remote locations and for pinpointing outages or other problems, the ability to

[5] Energy Policy Act of 2005, Pub. L. No.109-58.

transmit schematics, blueprints and other necessary data to field crews, as well as video surveillance to prevent copper theft and to provide overall security throughout the grid.

Electric utilities are undergoing significant changes in the industry. As mentioned, NERC cyber security and Reliability Standards are going into effect.[6] Electric utilities must be auditably compliant with NERC CIP standards this year. Electric utilities are subject to fines of one million dollars per violation per day for failure to comply with these standards. There are also regional Reliability Standards that apply. New renewable energy and carbon emission requirements are likely to be legislated at the state and federal levels. Furthermore, there is the potential for federal energy efficiency legislation, and increasing interest among regulators in demand response programs. In addition, plug-in hybrid electric vehicles ("PHEVs") are soon to be produced– which may require utilities to be able to track consumption as PHEVs travel from place to place, control the time of day when PHEVs will be charging so as to reduce peak demand, and manage the electricity that will be fed back onto the grid from the PHEVs. Furthermore, electric utilities are facing the growth of distributed energy sources, such as rooftop solar panels and wind turbines, and that presents the challenge of managing data between the utility and a large numbers of discrete, distributed energy sources.

In order to address these developments, there are currently efforts underway involving Smart Grid interoperability standards and technology. Congress has authorized funding for Smart Grid demonstration grants and Smart Grid investment matching grants programs as part of

[6] See NERC Reliability Standards at http://www.nerc.com/page.php?cid=2%7C20. See also NERC Critical Infrastructure Protection ("CIP") Standards at http://www.nerc.com/page.php?cid=2%7C20. See e.g., Western Electricity Coordinating Council Reliability Standards at http://wecc1.guidance.com/Application/ContentPageView.aspx?ContentId=71

the Energy Independence and Security Act of 2007 and it appropriated $4.5 billion for these programs as part of the Recovery Act.[7] Congress explained that:

> It is the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve each of the following, which together characterize a Smart Grid:
>
> (1) Increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid.
> (2) Dynamic optimization of grid operations and resources, with full cyber-security.
> (3) Deployment and integration of distributed resources and generation, including renewable resources.
> (4) Development and incorporation of demand response, demand-side resources, and energy efficiency resources.
> (5) Deployment of "smart" technologies (real-time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices) for metering, communications concerning grid operations and status, and distribution automation.
> (6) Integration of ''smart'' appliances and consumer devices.
> (7) Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air conditioning.
> (8) Provision to consumers of timely information and control options.
> (9) Development of standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid.
> (10) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.[8]

Thus, the Smart Grid is expected to advance the nation's agenda by providing a stronger electric grid for the delivery of more reliable power, integration of renewable generation, provide a critical means to reduce energy consumption and greenhouse gas emissions. It is also expected to support the integration of diverse energy resources, provide customers with the information and tools that enable them to make better decisions on how and when they use energy, and provide new possibilities for emerging technologies.

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[7] See Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492 at § 1304 (2007) codified at 42 U.S.C. § 17384)("EISA07"); see also Recovery Act.

[8] See EISA07 § 1306(d).

COMMENTS

EEI fully supports the Commission's efforts to develop a National Broadband Plan that promotes the deployment and availability of broadband infrastructure and addresses the public policy goals set out by Congress. However, the Recovery Act makes clear that the National Broadband Plan should be viewed and developed as one of many interrelated components of a broader national policy effort that encompasses a wider array of interests and issues that include energy independence and efficiency. As the Commission develops its National Broadband Plan, the Commission should therefore not only consider the needs of broadband providers, but also the needs of those entities that use telecommunications services to provide the services and inputs that are necessary for broadband service to exist, such as electric power and other CII infrastructure.

In order to provide safe, reliable electric service, utilities must have communications systems that are robust and reliable, and demands on utility communications systems will be greater as regulators require utilities to operate more efficiently and to enhance the control systems needed to ensure reliability. As utilities deploy Smart Grid, they will need to enhance and expand their existing communications networks to provide greater coverage and capacity. Smart Grid will require real-time two-way communications capability all the way to the customer premises. Today, most utilities rely on one-way communications systems to support relatively slow-speed automated meter reading systems. This is only one example of how utilities will need to upgrade their communications networks to enable the multitude of potential Smart Grid applications that they choose to deploy.

Electric utilities and CII need dedicated licensed spectrum for existing and future uses. This spectrum is needed to support the growing voice and data needs for existing SCADA, voice dispatch, and mobile data applications for utility field workforce. It is also needed to support the new and expanding Smart Grid data needs. In general, electric utilities have not found that they can rely on commercial broadband services to meet all their requirements, and therefore private broadband networks will be essential in some areas. Accordingly, the Commission should consider ways that its National Broadband Plan can support utility communications needs in order to achieve the policy goals set out by the President and Congress.

A. Suitability of Communications Technologies

1. Electric utility telecommunications requirements:

The provision to the public of safe, reliable, and affordable electric service is an extremely complex endeavor and essential responsibility. In this task, electric utilities have expansive communications needs because they typically have extensive infrastructure that requires maintenance, remote control and monitoring. For example, electric utility field crews must have effective communications throughout service territories, and wherever individual customer meters must communicate back to the utility. All of these objectives require utilities to use communications systems, especially wireless networks.[9]

Utilities rely on a number of different wireless applications and services in support of their critical operational needs. For example, utilities rely on private land mobile radio systems for crew communications performing maintenance, storm recovery, or other essential work. Utility crews often work in difficult and dangerous conditions, sometimes in remote areas. The

[9] See "The Utility Spectrum Crisis, A Critical Need to Enable Smart Grid," Utilities Telecom Council, January 2009 at http://www.utc.org/fileshare/files/3/Public_Policy_Issues/Spectrum_Issues/finalspectrumcrisisreport0109.pdf. ("UTC Spectrum Report").

land mobile systems on which they rely must therefore provide sufficient geographic coverage and available capacity to allow crew communications at anytime, under any conditions, and particularly after severe weather events when other forms of communications are disrupted. Another example is SCADA systems, which are typically point-to-multipoint communications systems that allow for remote monitoring and control of facilities and equipment. Other utility wireless applications include telemetry, automated meter reading, and AMI. Other broadband applications that utilities need for their own internal uses include, but are not limited to, mapping for remote locations and for pinpointing outages or other problems, the ability to transmit schematics, blueprints and other necessary data to field crews, such as video surveillance to prevent copper theft and to provide overall security throughout the grid.

In addition to serving these types of critical functions, communications systems must also comply with rigorous mandatory and enforceable Reliability Standards pursuant to EPAct 2005. Under EPAct 2005, FERC and NERC have adopted mandatory and enforceable Reliability Standards for electric utilities, including cyber security standards. Compliance with these standards requires utilities to have reliable, secure communications systems capable of handling large amounts of data and traffic with an extremely low level of latency that broadband can provide. This means that utilities communications systems must work twenty-four hours a day, seven days a week, and 365 days a year at a very high level of reliability to meet America's everyday needs. This is especially the case during service outages, natural or man-made disasters or other emergency situations.[10] Such a demanding requirement for reliability means

[10] See UTC 2009 Spectrum Report at 9; See also Amendment of Part 94 of the Commission's Rules to Authorize Private Carrier Systems in the Private Operational Fixed Microwave Service, PR Docket No. 83-426, First Report and Order, 57 Rad. Reg. 2d (P&F) 1486, ¶ 53 (1985)(recognizing that utilities communications needs "tend to demand a reliability factor of 99.995 percent").

that utility and CII operations have little or no margin for any potential interference, interruption, or diminution of their critical wireless communications services.

2. Electric utility telecommunications requirements to support Smart Grid:

The deployment of new Smart Grid systems and technologies will add to utilities' need to use wireless communications systems since many utilities will require communications infrastructure that supports dynamic interaction between the utility and its customers. The need to accommodate the growth of rooftop solar panels and wind turbines as well as other distributed resources will require utilities to be able to manage large numbers of such resources. Furthermore, given the array of "Smart" devices that is contemplated to be connected from the customers' premises to the utility, this potentially means generating huge volumes of data and raising a host of issues with respect to bandwidth and latency as well as costs. Furthermore, Smart Grid will have to support different classes of information that will require it to be managed differently by utilities. For example, while operational data may be constant in volume and timing therefore requiring certain bandwidth and latency requirements, other information, such as telemetry-type data is similarly managed but presents greater data volumes. Additionally, data that is generated in reaction to grid events is generally unpredictable in frequency and needs to be processed with very low latency.

Wireless broadband communications will be an essential component of utility Smart Grid systems. In June 2009, the NIST released a report it had commissioned from the Electric Power Research Institute ("EPRI") on the development of technical standards for Smart Grid interoperability.[11] The report found that "Communications is a key aspect of ensuring

[11] See Electric Power Research Institute Report on NIST Interoperability Standards Roadmap, June 17, 2009 at 94,

interoperability and increased efficiencies." For example, many utilities implementing AMI systems have found that they require a separate wireless broadband infrastructure capable of delivering 24/7 high-speed communication to enable a variety of Smart Grid applications and their corresponding benefits. Such a communications system is needed to provide "cost effective" backhaul of AMI data, delivery of sophisticated management/control programs, and real-time connectivity within the utility to help improve service delivery, outage management, and overall productivity. See Comments of Motorola, GN Docket No. 09-51, at 32-33. Additional examples include remote monitoring and control (*e.g.*, SCADA, video surveillance, etc.), Wifi hotspots for field-work, demand response services, load management, and 6 GHz under-build network expansion and upgrades. See id at 33-34.

IEEE-USA has stated that, for "functional areas" of Smart Grid, "broadband is either required as a fundamental enabling technology, or can serve as a highly desirable means of removing bandwidth constraints." See Comments of IEEI-USA, GN Docket No. 09-51, at 15. IEEE has also explained that the need for broadband to support Smart Grid will fall into three categories. First, there is a basic need for high bandwidth and low latency. Second, IEEE-USA stated that there is a need for communication with a large number of nodes. Third, IEEE said there is a need for broadband related to new communications protocols and related data models and structures that "facilitate the common semantic framework that FERC has identified as priority." Finally, IEEE-USA has stated that these broadband capabilities will be necessary throughout the electric industry including rural and urban areas, pole tops, substation sites, and on customer premises as well as electric grid facilities. See id.

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available at http://nist.gov/smartgrid/InterimSmartGridRoadmapNISTRestructure.pdf.

EEI member companies similarly report that requirements for Smart Grid will generally entail the following elements:

- Coverage/Availability: Most utilities have large service areas that include both rural and urban locales. Electric utility infrastructure is often located far from any population centers.
- Bandwidth: available network able to carry the data.
- Latency: sufficient response time of the network.
- Reliability: network or service availability when the utility needs it.
- Affordability: cost-effective system.
- Security: appropriate network security for the application.
- Independence: network independent of end-use controlled subscription service.

3. Smart Grid network requirements vary for each application in the grid:

The Commission is correct to recognize that each particular network requirement for each application of the grid will vary with respect to factors such as latency, bandwidth, reliability, etc. See Notice at 2. The laundry list of characteristics of the Smart Grid outlined by Congress in the EISA07 is a strong indication of all the different applications that fall within the broad concept of Smart Grid. Hence, EEI strongly believes that there are multiple options to provide Smart Grid telecommunications solutions, which include both licensed and unlicensed private wireless, as well as commercial solutions, as each utility determines to be appropriate to fulfill its needs.

The Commission must recognize that electric utilities are deploying and will deploy a variety of Smart Grid applications using a variety of public and private communications networks as appropriate. Nevertheless, one thing that is certain is all these applications will need bandwidth to enable them, and every additional application implemented by a utility will require additional bandwidth – some more than others. Consider the following estimates of the bandwidth budget necessary for certain Smart Grid applications as shown below:

- Substations 0.2-1.0 Mbps per advanced substation
- Meters (advanced) 1.85 -2.0 Mbps per million meters (steady reads)
- Smart Sensors 500 Mbps - 4.75 Gbps per 10,000 devices.[12]

While many of these applications can be supported by wireline technologies, many will also require broadband wireless technologies. In this regard, EEI agrees with the comments of UTC, which includes survey data from utilities which validates utilities' need for dedicated spectrum to support broadband wireless for Smart Grid. Specifically, UTC found that utilities lacked two-way broadband capability for Smart Grid in three main areas: at the substation for monitoring and control, beyond the substation for intelligent grid devices; and at the customer premises for AMI/HAN and demand response applications. UTC also found that broadband wireless would be an important part of the communications networks that support Smart Grid, because of its wide area coverage, increased throughput, low latency and high security. EEI concurs with these findings.[13]

4. Suitability of private or commercial communications networks varies by application:

Some utilities may not wish to either build or own their own networks and may choose to lease network services from a telecommunications carrier or a service provider. Although utilities typically use commercial services for some portion of their communications needs (*e.g.*,

[12] See Charlie Arteaga, IBM, "Smart Grid, the Secret Sauce of BPL," a presentation to the United Power Line Council 2007 Annual Conference, Dallas, Texas.

[13] See Comments of UTC at Section II-III, and Attachment A (filed Oct. 2, 2009).

AMI/Automated Meter Reading), commercial networks are not typically designed or built to provide the levels of reliability, survivability, availability, and coverage that are necessary to meet utility communications needs, particularly in times of emergency. Some carriers in certain markets may have sufficient capacity to provide services to support Smart Grid applications, but there are continued concerns about lack of control, potential security vulnerabilities, and sharing of infrastructure with other users with limited or no provisions for priority and quality/reliability of service. These types of concerns arise from connecting an electric utility and the Smart Grid to a public carrier and its network that an electric utility will share with public subscribers. Utilities also may feel uncomfortable that commercial cellular networks do not prioritize data traffic, which is a requirement for many Smart Grid use cases. Additionally, utilities will want assurance of reliability and quality of communications services, and carriers are typically reluctant to provide these guarantees. Furthermore, utilities have great concerns with respect to the ability of commercial carriers to restore communications systems after an emergency event, and some utilities may prefer to rely on their own crews to restore private communications systems expeditiously. In sum, leasing a network is not always attractive to utilities because it generally does not put utilities in a position to control and manage the quality of the service and the reliability of the network.

B. Spectrum

As the Commission considers options for promoting broadband access and competition, it should recognize that CII could serve an important role in achieving that goal. As explained above, CII operate extensive, robust communications networks that reach areas that are not currently served by commercial carriers. These networks include both long haul and last-mile wireline and wireless technologies. These networks could be used to provide wholesale or retail communications services to unserved and underserved areas. Investor-owned utilities tend to have large, multi-state service territories, and are uniquely positioned to provide wholesale long-haul broadband services, as well as last mile access in parts of their service territories that are unserved or underserved.

UTC surveyed its members in 2005 and 2007 to determine their spectrum requirements to support Smart Grid and other private internal communications for CII. UTC documented the various radio systems that CII operate and the spectrum that they use. Based on the survey, as well as a 2002 study by KPMG, UTC determined that at least 30 MHz of spectrum would be necessary to meet CII needs for voice and data communications to support fixed and mobile applications. To free up the necessary spectrum, UTC asked policymakers to harmonize the U.S. with Canada, which has allocated the 1800-1830 MHz band to support its electric grid. UTC also called on the FCC to act on a petition (FCC RM-11429) that would give CII secondary access to additional frequencies as a means of easing spectrum pressure.[14] EEI supports these positions.

Furthermore, there are several reasons why CII need this spectrum. First, CII have been losing access to spectrum, due to refarming, rebanding, and pure reallocation forcing their removal from several critical allocations. This has resulted in increased congestion and interference to existing radio systems, as well as systems that are more costly to retain the same amount of reliable coverage. Second, CII need private internal systems to support their critical infrastructure systems; commercial systems are not suited to utility needs for various reasons. Specifically, the public telephone networks become overloaded and can be unavailable during and in the aftermath of emergencies and natural disasters. CII need to have a communications

[14] See UTC Spectrum Report (note that this includes 10 MHz for nationwide voice dispatch and 20 MHz for high speed data to support vehicular data, AMI, and Smart Grid and security needs.) Id.

system they can count on, and most commercial systems are not designed to withstand hurricanes and do not have the battery back-up CII need to communicate in areas where power has been knocked out. While CII do make some use of commercial systems, these are usually secondary communications, and UTC estimated that commercial systems might only account for 10% of utilities' spectrum needs.[15] Utilities must not be forced to use commercial communications services for their private internal communications, because commercial systems generally do not meet the reliability and security standards of utilities.[16] Accordingly, CII need access to licensed spectrum that is dedicated for CII purposes; and if the Commission does conduct a "spectrum census" or "spectrum inventory," it should give priority to CII by promoting access to additional spectrum for CII purposes and protecting existing bands used by CII from further degradation.[17]

There are also several reasons, including the FCC's own rules, why CII cannot and should not be asked to acquire this spectrum at auction. First, the utility industry as a whole is undergoing restructuring, consolidation and downsizing – and as such is under intense economic pressure to minimize costs. It is virtually impossible to conceive that a state regulator would approve a large, yet unknown amount of capital expense so that a utility could compete against

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[15] See "Hurricanes of 2005: Performance of Gulf Coast Critical Infrastructure Communications Networks", Utilities Telecom Council, November 2005, at http://www.utc.org/research-information/white-papers-0 (UTC Gulf Coast Hurricane Report).

[16] As noted elsewhere within these comments, utilities are subject to reliability and security requirements from FERC and NERC, as mandated under the EPAct 2005. See also EISA07 (requiring development of interoperability standards for Smart Grid). Utilities cannot afford to hand over the liability for their communications reliability to a third-party – if the network, subject to other demands and built to a consumer-serving economic model, should not perform as needed (regardless of any service level agreement). The utility must answer to regulators and the communities it serves for the resulting delay in response, longer outage or any other problems caused by defective communications.

[17] The Commission asks whether it should conduct a "spectrum census" or "spectrum inventory" to identify spectrum bands that may be suitable for wireless broadband services. See Broadband Notice of Inquiry at ¶44. EEI and UTC support the Comments of Southern Company, which suggest that the Commission relax the eligibility restrictions in the 700 MHz and 4.9 GHz bands and which suggest that the Commission evaluate the "use" of the spectrum according to the purpose for which it is used, not merely the amount that it is used.

commercial operators for spectrum, with no guarantee of success and large additional outlay needed for system build-out. Furthermore, CII cannot offset the costs of acquiring spectrum at auction through the recovery of commercial service revenues; CII networks are used exclusively for private internal communications. Beyond state-regulated utilities, municipalities generally are prohibited by statute from engaging in activities such as spectrum auctions; and cooperatives – owned by their mostly rural customers – are completely unable to compete financially. Even if CII could afford to compete with commercial carriers in a spectrum auction, the geographic areas that are licensed do not conform to the service territories of CII. Thus CII either must bid for more coverage than they need, or not enough. Finally and most importantly, CII provide "public safety radio services," which are auction-exempt. Congress and the FCC have agreed that CII should have access to spectrum without participation in an auction.[18] This promise, however, has never been fulfilled.

For all of these reasons, EEI joins with UTC and other electric industry trade associations to respectfully request that the Commission support the allocation of at least 30 MHz of spectrum to CII, as defined previously by the FCC.[19] Such an allocation could be harmonized with a similar allocation that is underway in Canada. Industry Canada is completing a proceeding to allocate 30 MHz of bandwidth below 2 GHz for use to benefit the electric grid. Specifically, it has decided to reallocate the 1800-1830 MHz band to support the operations, maintenance and management of the electricity supply. Industry Canada explained that the purpose of this allocation is to support distributed generation, smart metering, and to enable

[18] See Pub. L. No. 103-66, Title VI, § 6002(a), 107 Stat. 312, 387 (1993). See also Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended, First Report and Order, WT Docket No. 99-87, 15 F.C.C.R. 22709 at ¶¶77-78 (2000)(agreeing with UTC that critical infrastructure industries provide public safety radio service).

[19] See 47 C.F.R. §90.7.

electric utilities to comply with new reliability requirements for substation monitoring and control that were instituted by the NERC in the aftermath of the Northeast blackout in 2003.[20] These factors apply with equal force to a harmonized allocation of 30 MHz in the U.S.

In the United States, 1800-1830 MHz is allocated currently for Federal Government use. The Commission could serve an important role in promoting the use of this band for CII purposes by coordinating with the Federal agencies that are using the spectrum, as well as coordinating with energy regulators at all levels of government, including DOE, FERC, and state public utility commissions. The Commission should also coordinate with industry organizations such as NERC and agencies such as NIST, which are working to develop standards for infrastructure reliability and Smart Grid interoperability.[21] Importantly, the spectrum must allow flexible use to permit CII to select appropriate bandwidths for certain CII applications, and it must be made available in a timely manner so as to enable harmonization with Canada, which will promote economies of scale that will drive down costs and promote interoperability at the opening stages of Smart Grid implementation. EEI looks forward to assisting the Commission in these efforts.

C. Real-time data, metering, and HANs

Dynamic pricing is one approach that is thought to provide numerous benefits to utilities and customers alike by lowering the need for expensive peaking capacity, improving system reliability, and reducing power costs. Dynamic pricing, which includes real-time pricing

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[20] See http://www.ic.gc.ca/epic/site/smt-gst.nsf/en/sf08971e.html for more information on this proceeding.

[21] NIST is required under Section 1305 of the EISA07 to develop a framework for Smart Grid interoperability. Its goal is to develop the roadmap for Smart Grid interoperability by September of 2009. See http://www.nist.gov/smartgrid/. See also, "Locke, Chu Announce Significant Steps in Smart Grid Development" at http://www.energy.gov/news2009/7408.htm. ("Smart Grid is an urgent national priority that requires all levels of government as well as industry to cooperate.")

("RTP"), addresses the problem that retail tariffs typically do not account for the time-varying nature of demand, and therefore do not provide effective price signals to consumer in order to impact consumption. RTP is only one form of dynamic pricing, and it establishes that customers pay electricity prices that are linked to the wholesale cost of electricity on an hourly (or even sub-hourly) basis.[22] Typically, RTP is offered to only the largest customers, those above one MW of demand. RTP programs post prices that reflect the cost of producing electricity during each hour of the day, and thus provide accurate price signals to customers, giving them an incentive to reduce consumption during the most expensive hours. Over the past several years, over 70 utilities have offered RTP in either pilot or permanent programs.[23]

A key component for the implementation of dynamic pricing and RTP programs is AMI that allows for two-way communication between the utility and the HAN.[24] Since the premise of dynamic pricing is based on pricing the usage of customers differently at different times of the day determined by electric power system conditions, customer usage must be metered by increments of time required by the specified pricing mechanism and communicated from the customer to the utility. See IEE Dynamic Pricing Whitepaper at 5. In other words, unlike the analog meter, from which it is costly to collect data on real-time, consumption AMIs can record and enable two-way communication between the end-users and the utility. This interaction can even extend to the appliance level if the customer's appliances and devices are two-way communications-enabled. AMI enables more effective communication between the utility to the

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[22] Price signals can be conveyed by providing consumers with on time-increments that are not real-time but are shorter than the traditional one month billing cycle.

[23] See "Moving Toward Utility-Scale Deployment of Dynamic Pricing in Mass Markets," Prepared by the Brattle Group and the Institute for Energy Efficiency ("Dynamic Pricing Whitepaper") available at http://www.edisonfoundation.net/iee/reports/IEE_Utility-ScaleDynamicPricing_0609.pdf.

[24] AMI may be defined as: a metering system that records customer consumption (and possibly other parameters) hourly or more frequently and provides for daily or more frequent transmittal of measurements over a communication network to a central collection point.

customer through devices, such as programmable communicating thermostats, thereby making it easier for customers to respond, or, in some cases, allowing the customer (or the utility) to automate the customer response. See IEE Dynamic Pricing Whitepaper at 6.

Many utilities are now filing AMI business cases with their regulatory commissions because such expenditures must typically pass a benefit-cost test and be approved. In over 30 states, utility-wide AMI deployment to mass market customers is underway, planned, or proposed. It is expected that over the next five years, a larger percentage of mass market customers in the United States will have AMI or some type of Smart Meter in their home or small business. A large portion of the costs of AMI may be justified through operational benefits such as remote meter reading, faster outage detection, fewer truck rolls, and remote on/off service switching. There are also significant demand response benefits from dynamic pricing that may justify the AMI investment and achieve overall positive net benefits as well.

1. Current and expected Smart Meter deployments:

In response to the Commission request for information on current Smart Meter deployments,[25] EEI notes that comprehensive information about the status of AMI deployment in the U.S. is available from FERC in its FERC 2008 Staff Report on "Assessment of Demand Response and Advanced Metering."[26] In this report, FERC Staff surveyed utilities nationwide to identify the percentage of total meters being used for advanced metering. The report also surveyed participants on the use of AMI meters beyond automated meter reading. The top five most cited uses of AMI (beyond automated meter reading) were enhanced customer service, outage detection, detection of theft and other line losses, outage restoration and remote

[25] See Notice at 3.

[26] This report is available at http://www.ferc.gov/legal/staff-reports/sep-09-demand-response.pdf.

connect/disconnect functions. Other cited uses of AMI were its use with HANs and for prepay metering.

Based on this report, AMI penetration in the U.S. has grown significantly from less than one percent to 4.7 percent between 2006 and 2008. Driven by federal legislation such as EPAct 2005 and EISA07, and by individual state policies, more utilities have announced plans to deploy AMI in the near future. Furthermore, the Commission may refer to a map and table prepared by the Edison Foundation and the Institute for Electric Efficiency that represents Smart Meter deployments, planned deployments, and proposals by investor-owned utilities and some public power utilities ("Attachment I").[27] While Smart Meter deployments by rural electric cooperatives are not included in this document, it illustrates planned and proposed deployments of Smart Meters across the U.S. in the next decade. Significantly, if full deployment for each of these proposals is achieved, a total of 58,283,000 meters will be installed and operable by 2019 – this represents roughly 45 percent of the U.S. households.[28]

Additionally, EEI notes that the IEE Dynamic Pricing Whitepaper reviews five programs from the past five years that have measured how the customer responds to dynamic pricing in pilot programs and in full-scale roll out settings. See IEE Dynamic Pricing Whitepaper at 12-20. The Commission should note that in some cases "customers did not have enabling technologies," while in other cases, customers were given choices of installing enabling technologies such as smart thermostats and/or load controllers for water heaters and pool pumps. See IEE Dynamic

[27] See http://www.edisonfoundation.net/iee/issueBriefs/Smart%20Meter%20Rollouts_0909_web.pdf. This list is not a compilation of utility applications to the Department of Energy for Smart Grid funds made available through the Recovery Act. An updated version will be released after those grants have been awarded. For more information, visit www.edisonfoundation.net/IEE/.

[28] See "2009 Annual Energy Outlook," Energy Information Administration ("EIA"), at http://www.eia.doe.gov/oiaf/aeo/index.html.

Pricing Whitepaper at 13-14. One conclusion of this study was that enabling technologies, such as programmable communicating thermostats, and central air conditioner switches, increase customer response to price signal. However, significantly, IEE's study concluded that there is no one-size-fits-all dynamic pricing structure. EEI agrees that each utility has to determine the dynamic pricing regime that would best fit the characteristics of its system, their customers and their demand response goals. Similarly, utilities must have the flexibility to determine the appropriate enabling technologies to support such pricing regimes.

2. Current customer access to individual real-time data:

A number of Smart Grid demonstration programs are highlighted in the second table on page four of Attachment I. These projects are either underway or have been proposed that are designed to investigate how the combination of Smart Grid technologies, such as advanced distribution technologies web portals, in-home displays, automation, and smart appliances, will impacts consumers' energy use. Unlike utility-scale deployments of Smart Meters, these demonstration projects are usually smaller and focus on a single municipal area – they do not extend to entire states or in rural areas. Each program is different in scope, with some programs intended to cover entire city populations while others may target certain areas or demographics. However, the potential for growth of these systems will contribute to the use of real-time data and communication system requirements.

3. Third-party access to real-time data:

Traditionally, privacy regulation of customer data has been the responsibility of the states. All information was furnished directly from the consumer to utilities in confidence, and it was well established that the public interest required maintaining the privacy of that information. Disclosure of consumer information to a third-party was only permissible with the consent of the customer. Currently, each electric utility has its own data ownership policy in accordance with the regulations of its state regulatory authority or authorities. In most states, the consumer owns the data and, depending on the state, may opt in or out of consenting to information disclosure under regulations that were crafted to support retail access. For example, in Arizona, after receiving written authorization, a load-serving entity is required to release a customer's billing data, including consumption, demand and power factor (if available) for a 12-month period to an electric service provider specified by the customer – opt-in for transfer of data (see also, Rhode Island).

In contrast, Massachusetts competitive suppliers are allowed access to customer information without obtaining customer consent, but that consumer could opt-out (see also Ohio, Oregon, Pennsylvania and Virginia). Most states appear to have adopted an opt-in approach by requiring written customer authorization for disclosure of any customer information (*e.g.*, Arkansas, California, Connecticut, Delaware) District of Columbia, Illinois, Maine, Maryland, Montana, New Hampshire, New Jersey, New York, and Rhode Island). In some states, such as Maine, customer authorization may be obtained simply though a notification in the competitive provider's terms of service document. Furthermore, some states allow for recovery for the cost of transferring data (*e.g.*, Illinois and Maine).

Utilities must consider consumer general information, and data generated by the meters and/or HANs, and devices connected directly for third-party access. The host of devices in a customer's premises that may potentially be connected to the HANs, to the meters, and to the Internet, raises an additional privacy and security concerns for consumers and utilities. For example, one concern may be that private information could be gathered without the consumer's knowledge of what data is actually being collected and furnished to third-parties. If consumers are not able to know the scope of information they are consenting to disclose, concern may arise about whether consumers will be able continue to give express consent by merely checking a box.

CONCLUSION

WHEREFORE, the foregoing reasons, EEI respectfully requests that the Commission consider these comments and ensure that any future Commission action ordered as a result of this proceeding is consistent with them.

Respectfully submitted

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October 2, 2009

ATTACHMENT I